

REMARKS

Claims 1, 3 and 4 have been allowed. Claim 2 has been amended. Thus, claims 1-10 remain pending in the present application. Support for the amendment to claim 2 may be found in the specification at, for example, page 22, line 5 to page 27, line 8. No new matter has been added. Reconsideration and withdrawal of the present rejections in view of the comments presented herein are respectfully requested.

Rejections under 35 U.S.C. 103(a)

Claim 2, as well as its dependent claims, Claims 5 and 9-10, were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over either Meier et al (US 4,994,346) alone, or over Knudsen et al. (US 5,262,280) alone.

The present invention relates to a chemically amplified positive photosensitive thermosetting resin composition, to a method of forming a cured article, and to a method of producing a functional device. The invention provides a technique capable of forming a resin layer which is excellent in fluidity upon heat bonding and also has excellent adhesion as well as bonding properties and/or sealing properties, after pattern formation, in a photosensitive thermosetting resin composition used as a permanent film (see page 4, lines 19 to 25).

Present Claim 2 recites a resin composition which comprises a compound (B) generating an acid under irradiation with radiation represented by the general formulas (V), (VI), (VIII) or (X). The component (B) is preferably a compound with high acid generation efficiency when irradiated with ultraviolet light in which g-rays, h-rays and i-rays coexist, or i-rays (specification at page 21, line 24 to page 22, line 4). Neither Meier et al., nor Knudsen et al., disclose or even suggest such a photo acid generator.

The resin composition recited in Claim 2 also includes a component (C) which is a crosslinking polyvinyl ether compound and acts as a crosslinking agent for the component (A) (specification at page 11, lines 16 to 18). Although this type of crosslinking agent is not generally used in a positive type resin composition, it is suitable for use in the presently claimed positive photosensitive resin composition because the crosslinking reaction with component (A) occurs upon heating during prebaking to form an alkali-insoluble resist layer on the entire surface of the substrate. The crosslinking is then decomposed by action of an acid generated from component (B) upon exposure. Thus, the exposed area becomes alkali soluble while the

unexposed area remains alkali insoluble (specification at page 11, line 21 to page 12, line 4). Moreover, a component (D), an epoxy resin, does not act as a crosslinking agent upon prebaking and PEB (post-exposure baking) and curing (crosslinking) proceeds upon postbaking (specification at page 28, lines 3 to 7).

When the combination of recited elements in Claim 2 is present, the crosslinking agent (C) reacts during the prebaking process, then is decomposed during the exposure process, which enables the exposed area to be alkali soluble. Thus, it is possible for the exposed area to be dissolved and removed during the development process as a conventional positive type resin composition. In contrast, the crosslinking agent used in a negative type resin composition as disclosed in both Meier et al. and Knudsen et al. reacts during the exposure process, and then cannot be decomposed. The crosslinking agent in Meier et al. reacts by an action of an acid generated from the photo acid generator, and therefore cannot be used in positive type resin composition. The crosslinking agent in Knudsen et al. acts as a crosslinking agent by an action of an acid generated from the photo acid generator during the exposure process (see column 2, line 63 to column 3, line 2). As a result, the exposed area cannot be dissolved and removed during the development process. Thus, when present in combination with the recited compound (B), the crosslinking agent (C) and epoxy resin (D) recited in present Claim 2 does not have the same effect as that disclosed by Meier et al.

The presently claimed invention provides several significant unexpected results that distinguish the claims from the cited prior art references. As discussed above, in the present invention, the crosslinking polyvinyl ether compound (C) acts as a crosslinking agent during the prebaking process, then is decomposed by an action of an acid during the exposure process, and an epoxy resin (D) acts as a crosslinking agent during the postbaking process. Nothing in the cited prior art or anything else in the prior art would suggest that such results could be achieved. Moreover, the combination of the photo acid generator (B), the crosslinking agent (C) and the epoxy resin (D) result in a photosensitive thermosetting resin composition used as a permanent film, capable of forming a resin layer which is excellent in fluidity upon heat bonding and also has excellent adhesion as well as bonding properties and/or sealing properties, after pattern formation (specification at page 6, line 5 to 11). These unexpected properties are neither disclosed nor suggested by Meier et al. or Knudsen et al., and could not have been predicted by one having ordinary skill in the art. Thus, the unexpected results strongly support the

nonobviousness of the present claims over the cited references. Accordingly, Claim 2 is both novel and nonobvious, and should therefore be allowable. Claim 5, 9 and 10 depend either directly or indirectly on Claim 2, and should also be allowable.

In view of the comments presented above, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

CONCLUSION

Applicants submit that all claims are in condition for allowance. No fees are believed to be due. However, if any fees are required, including fees for an extension(s) of time, please charge these to Deposit Account No. 11-1410. Should there be any questions concerning this application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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